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RemarksAbout the Amendment

The Amendments are requested in order to differentiate the presently claimed invention, which requires that the two layers of thermoplastic material that imbed the IR-blocking layer are thick enough to provide structural support necessary for safety glass applications, such as in automobile windshields. Support for these amendments are implicit in the teachings of the present invention, such as at page 4, lines 11-18, and explicit in the Examples. While verbatim support for "greater than 50 μ m" is not found in the present application, the Applicant is allowed to exclude from the claims that which was claimed or disclosed in the prior art. Frost clearly discloses the use of polyurethane in at most a thickness of 50 μ m for the adhesive layer in contact with the IR-blocking coating, and so this range can be excluded from the Applicant's claims. Further, Frost teaches that an acceptable interlayer thickness for commercial interlayers is from 0.3 to 1.0 mm.

New Claims 8-10 further delimit the thickness limitations for the layers of the present invention.

Traversal

The Examiner rejects Claims 1 and 3 as anticipated by Frost et al (US Pat. No. 5, 932,329) under 35 USC §102(b). The Examiner describes Frost as exemplifying an IR light-reflecting coating sandwiched between two unplasticized thermoplastic adhesive layers (polyurethane).

The Applicant respectfully contends that the present invention is not anticipated by Frost. It is apparent from the teachings of Frost that the invention disclosed therein comprises an "extremely thin" coating of an adhesive (apparently not intended to be used as a structural support layer), and a second layer of polyurethane of conventional thickness that would function as a structural layer. The layer

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of adhesive can be thermoplastic (that is, plasticized) PVB or polyurethane. The extremely thin adhesive layer can be no thicker than at most 50 μm . In fact, in Frost it states that the invention described therein only works if the first adhesive layer is "extremely thin" -- that is, not greater than 50 μm (see Column 3, lines 8-17) -- and the second layer is of commercial thickness (0.3 to 1 mm thick). The prior art in Frost therefore teaches that 50 μm thickness is not functionally the same as 0.3 mm thickness in a safety glazing, and that imbedding an IR-blocking layer inside of two layers of commercial thickness would not work.

The present invention teaches imbedding the IR-reflective layer of the multilayer laminate inside two protective layers of unplasticized thermoplastic material, wherein commercial thicknesses for each of the two outer layers of the multilayer IR-reflecting laminate can be used successfully (see Example 1 of the present invention, wherein two 15-mil thick sheets were used on either side of the IR-blocking film).

As amended, Claims 1 and 3, and new claims 8-10 require thickness in the interlayer that produces a product that can impart properties suitable for use in a laminated glazing structure.

The Examiner rejects Claims 1-4 as obvious under 35 USC §103(a) over Frost in view of Bolton (US Pat. No. 4,906,703).

The Applicant respectfully disagrees. The teaching of Frost is that an IR-blocking film can be adhered to glass using an adhesive material such as polyurethane. The teaching of Bolton is that high impact plastic can be combined with an ionomer/glass laminate to provide laminates having enhanced structural integrity. There is no motivation for one of ordinary skill in the art who is looking to provide an IR-blocking laminate having improved optical/aesthetic properties to look to Bolton for the solution.

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Bolton does not suggest the use of ionomers as an adhesive material capable of bonding to the IR coating disclosed in Frost. Nor does Frost describe the materials used in Bolton as suitable adhesives for use in the practice of Frost. The Applicant respectfully suggests that, but for the Applicant's disclosure, the Examiner would not have combined the references in the same manner and found the same invention as claimed by the Applicant. The Examiner instead found the suggestion to combine the references in the Applicant's disclosure, which is hindsight reproduction of the Applicant's invention.

Further, the references need to be considered for all they teach, even the parts that teach away from the Applicant's invention. Frost, at column 3, lines 29 to 33, teach that the adhesive layer that fixes the IR-blocking layer to glass is preferably very thin, most preferably from 5 to 10 μm . This is in direct contradiction to both the present invention and to Bolton, which teach interlayer thicknesses much greater than 50 μm . One of ordinary skill in the art understands that the strength and performance of a safety glazing is dependent on the thickness of the layers, and that preferential use of extremely thin layers would not provide adequate performance.


Particularly when confronted with the statement in Frost that the invention could not work with coating thicknesses greater than 50 μm , one of ordinary skill would not have an expectation of success from the combination suggested by the Examiner. Additionally Bolton, at Figure 13, teaches the use of PET as an outside layer of a multilayer laminate to prevent abrasion of the laminate - not as an inner support layer for an IR coating. Bolton does not teach an IR coating that is in contact with an ionomer, nor does Frost. The Applicant, however, does teach and claim such an interface between ionomer and IR-coating.

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Thus the Applicant believes that the presently claimed invention is not obvious in view of the references. The Applicant believes that the claimed invention is novel and non-obvious over the cited art, and respectfully requests that the Examiner reconsider the rejection of the Claims, and instead issue a Notice of Allowability for Claims 1-4 and new Claims 8-10.

Respectfully submitted,



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